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Pressing Method Alters White Grape Juice Oxidation

Study finds crushing grapes before pressing raises juice yield but also increases the must’s tendency to brown.

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A new study published Monday in OENO One found that the way white grapes are pressed can change not only how much juice is extracted, but also how easily that juice oxidizes, a result that could matter for producers of white and sparkling wines trying to limit browning and preserve freshness.

The research compared direct pressing, in which whole grape clusters are pressed intact, with pressing after crushing, a method that breaks the berries before they go into the press. Working with Parellada grapes harvested in Tarragona, Spain, the

authors measured juice yield, turbidity, acidity, phenolic content, oxygen consumption and tyrosinase activity across successive press fractions. They reported that pressing after crushing produced more juice and improved mechanization efficiency, but also led to musts with higher turbidity, more phenolic compounds, lower potential alcohol, lower titratable acidity and greater oxidability.

The study is important because pressing is one of the first major decisions in white winemaking and can shape the chemical profile of the must before fermentation begins. In sparkling wine production, where clarity and resistance to oxidation are especially important, small changes at this stage can affect the quality of the finished wine.

The researchers found that musts from crushed grapes consumed oxygen faster than those from direct pressing, even though their tyrosinase activity was lower. That result suggests that enzyme activity alone does not explain how quickly a must oxidizes. Instead, the availability of oxidizable substrates, especially hydroxycinnamic acids released during crushing, appears to play a larger role.

The team used a pneumatic press and collected samples from each pressing cycle. They then analyzed turbidity, pH, acidity, phenolic index, color, oxygen consumption and tyrosinase activity. They also measured hydroxycinnamic acids and grape reaction product by HPLC-DAD and checked potassium and calcium levels by ICP-MS. The work was carried out on grapes from the 2024 harvest at Universitat Rovira i Virgili's vineyard in Constantí.

According to the paper, direct pressing limited extraction from skins and other tissues more effectively than crushing before pressing. That helped keep phenolic levels lower and reduced the must's tendency to consume oxygen quickly. By contrast, crushing increased exposure of internal grape tissues to oxygen during filling and pressing, which likely contributed to the higher oxidation risk.

The authors said their findings support a more nuanced view of oxidation in grape must. Tyrosinase remains important, but it is not the only factor that matters. The composition of the juice itself, especially the amount of phenolic material available to react with oxygen, may be just as important in determining how stable the must will be

during handling and early winemaking.

For wineries making white or sparkling wines, the practical implication is straightforward: pressing choices can be used to manage oxidation risk as well as yield. A method that extracts more juice may also extract more compounds that make the must harder to protect from browning later on.